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AXIAL-FLOW FAN AND PROJECTOR PROVIDED WITH THE SAME

BACKGROUND OF THE INVENTION

Technical Field of the Invention

[0001] The present invention relates to an axial-flow fan and a projector. More specifically, the present invention is directed to an axial-flow fan capable of securing high static pressure and reducing noise, which is suitably used for an apparatus having a light source, such as a projector.

2. Description or Related Art

[0002] Conventionally, a projector has been used for presentations at conferences, academic societies, exhibitions, etc. Such a projector modulates a light beam irradiated by a light source in accordance with image information to form an optical image, and projects the optical image in an enlarged manner.

[0003] In such a projector, the luminance of the light source has to be enhanced for sharply displaying the optical image, and the heat generated by the light source has to be exhausted to the outside of the projector. Accordingly, a cooling mechanism is provided for drawing in external cooling air by a fan and guiding the cooling air to a predetermined spot by a duct. The air is discharged to the outside from an exhaust hole provided on the projector.

[0004] In order to guide the cooling air to the exhaust hole, for sufficiently cooling the interior of the projector, high static pressure has to be secured. If a conventional fan is used for obtaining sufficient flow rate rather than static pressure, the fan has to be rotated at a high speed to secure high static pressure and to obtain a predetermined flow rate. Further, density of heat sources is increased in accordance with size reduction of the projector, so that a predetermined static pressure and flow rate have to be secured for sufficient cooling. Thus, the fan has to be rotated at a high speed. As described above, in order to secure the necessary flow rate and static pressure for sufficient cooling, high-speed rotation of the fan is inevitable, which result in noise. Since such projectors have come to be used not only for presentation purposes but also for home-theater system, reduction of noise is strongly desired.

[0005] An object of the present invention is to provide an axial-flow fan capable of securing high static pressure while reducing noise, and a projector having the axial-flow fan.

SUMMARY OF THE INVENTION

[0006] An exemplary embodiment of the axial-flow fan, according to an aspect of the present invention has: a main shaft; a plurality of main fins provided on the outer circumference of the main shaft, the main fins being inclined relative to an axial direction of